Philosophical Magazine B, 79(8): 1145-1159

Structure and Thermopower of Solid Solution of Nickelocuprates La2-xSrxCu1-yNiy, O4

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Abstract

A series of materials represented by La2-xSrx, Cu1−y., .Niy, O4 has been prepared using a basic carbonate coprecipitation technique. The disappearance of superconductivity at higher Ni contents usually accompanies the localization of carriers at low temperatures. A metal-like temperature dependence (dR/dT > 0) occurs up to x = 0.36 and y = 0.2 with a metal-non-metal transition at low temperatures. In comparison with La1 85Sr0.15 Cu1−yNiyO4, the metal-non-metal transition can be 'tuned' by varying the Sr content at a given Ni content. For non-metallic samples and those materials which show localization at low temperatures, their conductivity follows the form exp[(T 0/T) v] with ν = ¼ or ½ (variable-range hopping law), indicating that the localization of carriers is caused by disorder. When considering the effects of carrier concentrations and disorder in the system La2-xSrxCu1−yNiy.O4, the phonon-drag contribution seems to play a part in their thermopower.